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Maryland Roadside Tree Care Expert Exam Study Guide

For Exam Domain:

Chapter 9: Construction and Trees

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Construction damage is one of the most common causes of tree death and decline in urban areas. Tree damage on construction sites can occur from soil compaction, root removal caused by changes in soil grade, branches that may be broken, tree trunks that may be damaged, and by incorrect pruning by untrained personnel. The two most important factors to protect trees from during construction activity are **soil compaction** and **root removal** from grade changes.

Roots extend much farther than the dripline of a tree and will be found mostly in the upper few inches (12 to 18) of the soil. Most of a tree's absorbing roots are in the upper 12 inches of soil to be able to use oxygen and water.

When soil is compacted by construction activities, the pore space between soil particles is greatly reduced. This reduces the ability of roots to absorb oxygen, water and minerals. The ability of roots to grow and expand is reduced as they cannot penetrate the soil.

Changes in grade can reduce root volume and affect the roots ability to get oxygen and water. If roots are removed or damaged, decline may occur within a few months or few years. It is commonly thought that a healthy tree can tolerate removal of approximately 1/3 of its roots. If few to no roots over 1 inch in diameter will be impacted by construction activity, the tree will probably tolerate the impact.

If the grade is raised, roots may be suffocated. As little as four inches of soil can kill some species. Aeration can help soils that have been compacted or where grade has been raised six inches or less. The aeration holes can be filled with peat moss, sand, vermiculite, or pea gravel.

If the grade is raised, use tree wells. If grade is raised more than 6 inches, then a tree well with aeration and drainage tiles should be considered. Even as little as 4 inches of soil placed over tree roots can kill some species.

If the grade is lowered, then a retaining wall should be considered. Maintain as much of the roots and original grade as possible. Prune the roots cleanly with a sharp tool. A tree island can be used where the grade has been lowered completely around the tree.

Horizontal trenching can be used when compaction has occurred. Narrow trenches are dug in a spoke pattern around the tree, then backfilled with topsoil or compost. Root growth in the trenches will exceed root growth in the surrounding soil. A two to four inch layer of wood chips may also be added over the top of the backfilled trenches.

Prevention is the best way to minimize damage to trees during construction. Assess the site before construction, decide which trees to save before construction begins and write construction specifications to protect them. Place construction fences around trees to be saved. Minimum distance to place the protective device would be the dripline of the crown. Ideal distance would be 1 and 1/2 (in feet) times the diameter (in inches) of the tree. Place construction signs around trees to be saved.

For temporary traffic over the critical root zone, you can use vertical mulching and then place 6-12 inches of mulch to disperse the weight of equipment. When construction is finished, half of the depth can be removed and spread out over the area under the dripline as mulch.

Trenching can severely injure a tree. Tunneling can help to prevent root damage. Minimum depth below the surface should be 24 inches and should be slightly off center. This will allow the tunnel to travel under the roots in the upper 12 to 18 inches and to miss any tap roots that may be present.

If roots must be severed, clean cuts should be used. Backfill soil to minimize any drying of the roots. Treatment of damaged trees should begin when the damage occurs. If a significant portion of the root system is destroyed, then the remaining root system should be pampered. Mulch it to hold soil moisture, moderate temperature extremes and remove competition from turfgrasses and weeds.

If root damage occurs, the remaining roots must be pampered. Mulch around the roots to hold soil moisture, moderate the temperature, and remove competition from turf and weeds. Regular irrigation is effective as trees that do not become moisture stressed have a better survival rate. Maintain the tree's vitality to avoid stress and infestation of insects and diseases. If fertilizer with nitrogen is needed, use a slow-release form after a period of recovery.

Another important element to protect trees from construction damage is operator care when maneuvering booms and trucks near trees to avoid mechanical damage. The single most important element to protect trees from construction damage is highly visible tree protective fencing that can help remind workers to stay away from tree protection zones.

A tree's ability to tolerate impacts from construction depends on its age, health, and vigor. Some defensive dieback will occur when root loss is significant. Expect this to begin one to two years after construction. Treatment of construction-damaged trees is an on-going process and should be continued over the life of the tree.